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Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended to further clarify Applicants disclosed and claimed invention and new claims added. No new matter has been entered.

Support for the amendments is found in the Figures (Figure 5A) and in the previously presented claims and Specification.

It is noted that Examiner has failed to acknowledge or examiner previously presented claims 21-28.

Claim Rejections under 35 USC 102/103

1. Claims 1-2, 6, 9-10 and 12 stand rejected under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Ke et al. (US 6,284,093).

Examiner merely states that:

"Ke et al. disclose and insert ring (Fig. 6-50) with an

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annular step (58) encircling a wafer support in a plasma-processing chamber (col 8 lines 28-39). The insert ring is surrounded and supported by a shadow ring (30) where in the shadow ring is extending vertically higher than insert ring. The insert ring comprises silicon (col 7, lines 65-67)."

Ke et al. disclose a ring forming part of a dielectric (e.g., quartz) shield surrounding a semiconductor workpiece in a plasma chamber where the ring has an elevated collar portion 30 having an inner surface 32 oriented at an obtuse angle that causes ion scattering in a direction more parallel to the plane of the workpiece, thereby reducing erosion of an underlying portion of a dielectric shield e.g., 38; Fig. 2, 3, 6; Abstract; col 7, lines 25-35; col 8, lines 28-39) which is also covered by two protective rings (56 and 58) (e.g., silicon) see (col 5, lines 25-30; col 6, lines 8-16, 31-32).

Examiner refers to Figure 6 (50) which shows a flat lower protective ring and an upper protective ring 58) having inner and outer surfaces at 45 deg (see col 11, lines 37-42).

Examiner is mistaken that upper ring 58 having a flat upper and lower surface is an annular step (58).

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Ke et al. fails to disclose Applicants stepped insert ring structure and is therefore insufficient to anticipate or make obvious Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir.

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1991).

2. Claims 1, 6, and 12 stand rejected under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Ishii et al. (US 5,529,657).

Examiner merely states that:

"Ishii et al. disclose and insert ring (Fig. 5-6b) with an annular step encircling a wafer support in a plasma-processing chamber. The inert ring is surrounded and supported by a shadow ring (6a) where in the shadow ring is extending vertically higher than the insert ring."

Examiner does not point out where it is disclosed that the ring 6b is supported on ring 6a, rather it appears from Figure 5 that the both rings are supported on rest table 3. For example see the disclosure of Ishii et al.:

"A plasma focus ring or directing ring 6 is provided on the upper surface of the rest table 3 to surround the wafer W. The focus ring 6 is made by an insulator, e.g., ceramic or quartz, or is constituted by an outer annular member 6a made of an insulator as described above and an inner annular member 6b made of a conductive material, e.g., carbon, as shown in FIG. 5 in detail. The inner circumferential surface of the focus ring 6 is formed to be similar to the outer circumferential surface of the wafer

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W, so that the clearance between the circumferential surface is uniformly kept at every points and is inclined to be raised from the inner peripheral edge toward the outer peripheral edge. When the focus ring 6 is made only of an insulator, assuming that an 8-inch wafer is to be processed, the ring width of the focus ring 6 is set to 30 mm, the height of the outer peripheral edge of the focus ring 6 with respect to the surface of the wafer W is set to 2 mm, the clearance between the wafer W and the inner edge of the focus ring 6 is set to 0.5 mm, and the height of the inner peripheral edge of the focus ring 6 with respect to the surface of the wafer W is set to 1.5 mm. When the focus ring 6 is made of the outer annular member 6a and the inner annular member 6b, it is preferable that they be slightly separated from each other."

Thus, Ishii et al. disclose that the inner ring 6b and the outer ring 6a (Fig 5) are spaced from one another and both are supported on the surface of a rest table.

Ishii et al. fails to disclose Applicants stepped insert ring structure and is therefore insufficient to anticipate or make obvious Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor*

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Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

3. Claims 1-2, 6, 9-10 and 12 stand rejected under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Daugherty et al. (US 5,529,657).

Examiner merely states that:

"Daugherty et al. disclose an insert ring (Fig. 5-508) with an annular step encircling a wafer support in a plasma-processing chamber. The inert ring is surrounded and supported by a shadow

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ring (512) where in the shadow ring is extending vertically higher than the insert ring. The insert ring comprises a semiconductor material which could be doped like silicon carbide (col 7, lines 66 col 7 line 21)."

Examiner does not point out where or how the two flat stacked rings (508 and 514) disclose Applicants invention including:

"a shadow ring encircling and supporting said insert ring, an outer portion of said shadow ring extending vertically higher than said upper step surface of said insert ring."

Rather, Daugherty et al. disclose where the upper ring 508 (supported on the lower ring 514) has a stepped surface to accommodate a wafer 522 (see col 9, lines 1-38). However, in Figure 4, Daugherty et al. disclose a single inner ring (408) that appears to be in part supported on an outer ring 418, **but has the same height as the outer ring, where both are at the same height as the wafer** (see col 7, lines 24-45). Daugherty et al. disclose that the inner ring 408 may be made of silicon carbide which may be doped (col 8, lines 1-8).

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Daugherty et al. fails to disclose Applicants stepped insert ring structure and is therefore insufficient to anticipate or make obvious Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir.

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1991).

Claim Rejections under 35 USC 103

4. Claims 1-12 stand rejected under 35 USC 102(e) as being obvious over Kanno et al. (USPUB 20030029572) in view of Ke et al., above.

Applicants reiterate the comments made above with respect to Ke et al.

With respect to Kanno et al., Examiner merely states that:

"Kanno et al. disclose an insert ring (focus ring Fig 8-32) of silicon (paragraph 60) with an annular step encircling a wafer support in a plasma processing chamber. The insert ring is surrounded by a shadow ring (unnumbered part) and is supported by it."

It is noted that Kanno et al. nowhere discuss the function, structure or material of unnumbered part which Examiner asserts without any basis is a shadow ring (note it is the same height as the focus ring and the top of the wafer, thus difficult to see how it was intended to or could function as a shadow ring to have a shadowing or focusing effect as explained by Ke et al. with

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respect to the ring 30 of Ke et al. (see discussion below).

Kanno et al. disclose a silicon focus ring (32; Figure 10) that is mounted on a dielectric film around the periphery of the staircase shaped wafer support (35) (see paragraph 0060). Among other aspects of Applicants invention, Kanno et al. **do not disclose an inert ring supported on a shadow ring.**

Examiner proposed modifying the silicon (conductive) single focus ring of Kanno based on the structure of the outer **dielectric** (e.g., quartz) shield ring 30 of Ke et al. who teaches that the high impedance of **dielectric** shield ring 30 functions to **reduce RF coupling** beyond the perimeter of the workpiece and extends above the workpiece to improve radial uniformity of the plasma process (shadow effect) (col 9, lines 6-19; col 10, lines 54-64) as well as where the obtuse angled face of the shield ring is taught to have a **focusing effect** (col 11, lines 1-17). Ke et al. also provides an inner **dielectric** shield portion 38 formed with reduced impedance to extend the plasma sheath radially beyond the perimeter to improve plasma sheet properties (col 9, lines 20-58). Note the flat inner rings (insert rings) 58 and 56 of Ke et al. are non-dielectric (such as the silicon focus ring of Kanno) with a relatively small electrical impedance.

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Thus, the conductive focus ring of Kanno and the dielectric ring of Ke et al. **operate by a different principle of operation** (high impedance versus small electrical impedance), thus there is no motivation (as a matter of law) to modifying the conductive focus ring of Kanno based on the teachings of the function of the dielectric ring 30 of Ke et al., and which would likely make the device of Kanno unsuitable for its intended purpose.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally

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available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

4. Claims 1-12 stand rejected under 35 USC 102(e) as being obvious over Ke et al., above, in view of Park et al. (US 6,464,794).

Applicants reiterate the comments made above with respect to Ke et al.

With respect to Park et al., Examiner merely states that:

"Park et al. disclose an insert ring (edge ring Fig 2-24) of silicon (col 5, lines 42-45) with an annular step encircling a wafer support in a plasma processing chamber.

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Examiner is mistaken, Rather Park et al. disclose in Figure 2 an edge ring (24) to fix the wafer in place supported on an aluminum coupling ring (27) that is completely underneath the edge ring and is surrounded by a focus ring (28) that is coplanar with the edge ring (24) (col 2, lines 1-8) in order to draw the plasma forming region to the edge of the wafer (**i.e. focus ring is conductive**) during the plasma process to improve plasma uniformity over the top of the wafer.

Examiner proposes modifying the height of the edge ring in Figure 2-24 of Park et al. based on the completely different structure of the **focus ring height** of focus ring 740 in Figure 15 (see col 10, lines 49-67) which may extend above the wafer surface or based on the completely different structure of focus ring 320 supported on the electrostatic chuck 310 in Figure 10 where it is clearly stated that the focus ring is used without an **edge ring** (col 7, lines 65-col 8, line 30) (and is coplanar with the wafer).

Thus, Examiner is attempting to modify the edge ring of Park et al. in Figure 2 by referring to different structures (Figure 10 and Figure 15) where only a focus ring is used (not an edge ring) and **the height of a focus ring discussed**. Thus, any

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motivation to modify Park cannot be found in Park (as a matter of law) since an edge ring (to fix a wafer in place) and a focus ring operate by a **different principle of operation**, and any modification of Figure 2 (removing the edge ring) would make the device in Figure 2 **unsuitable for its intended purpose**.

Nevertheless, any such modification of the edge ring in Figure 2 of Park does not produce or suggest Applicants invention.

Examiner does not state how Ke et al. suggests modifying Park to achieve Applicants invention.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *In re Ratti*, 270 F.2d 810, 123, USPQ 349 (CCPA 1959).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed.

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Cir. 1984).

"First, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Conclusion

The cited references, alone or in combination, do not produce or suggest Applicants disclosed and claimed invention, and therefore are insufficient to make out a *prima facie* case of anticipation or obviousness.

The Claims have been amended and new claims added to further

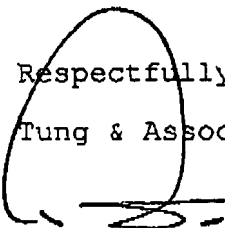
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clarify Applicants disclosed invention and to further define over the cited prior art. A favorable reconsideration of Applicants' claims is respectfully requested.

Based on the foregoing, Applicants respectfully submit that the Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in condition for allowance for any reason, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,
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